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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,162	03/15/2002	Takenori Narita	511.41485X00	2919

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EXAMINER	
PENG, KUO LIANG	

ART UNIT	PAPER NUMBER
1712	

DATE MAILED: 02/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/088,162	NARITA ET AL.
	Examiner	Art Unit
	Kuo-Liang Peng	1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/21/03 Amendment*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-11 and 13-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-11 and 13-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Applicants' amendment filed on November 21, 2003 was received. Claims 5 and 12 are deleted. Claims 1, 6-8, 13-14, 24, 30, 32 and 41 are amended. Claims 54-65 are added.

2. The text of those sections of Title 35, U.S. code not included in this action can be found in a prior Office Action (Paper No. 6).

3. Claims 15, 18-23, 25, 27, 29, 31, 34, 37, 40 and 43-65 are rejected under 35 U.S.C. 102(b) as anticipated by Ioka (JP 10-158012).

Ioka discloses a composition comprising a) a thermally decomposable polymer and b) an alkoxysilane. Both are dissolved in a solvent ([0006]). Alkoxysilanes with or without non-hydrolyzable group can be used ([0008]). The alkoxysilanes are partially hydrolyzed/condensed in situ ([0007]). Therefore, Ioka's composition does contain a siloxane oligomer. Ioka further discloses a low-permittivity film formed by applying the composition onto a substrate to form a film, heating the resulting film to condense the siloxane oligomer at a temperature below 100°C, finally, removing the thermally decomposable polymer at a temperature of 600°C ([0015], [0017], [0019], [0020] and [0024]). Ioka further teaches an LSI multiplayer having an insulator layer prepared by the low-permittivity film ([0026]). It is further noted that after the thermally decomposable polymer is removed, the resulting film contains only a material derived from the alkoxysilane oligomer. As such, there is no difference between the resulting low-permittivity film or the electronic part containing this film and Applicants' low-permittivity film or electronic part containing the low-permittivity film. The weight loss characteristics of the thermally

decomposable polymer are irreverent. Ioka further teaches the use of the composition for making electronic parts such as LSI ([0026]) wherein copper wires are widely used.

4. Claims 1-3, 8-10, 15-23, 26-29, 35-40, 44, 46-47, 50-51, 53, 55-56, 59-60 and 62-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narita (JP 11-217458).

Narita discloses a composition comprising a thermally decomposable polymer such as a fluorine resin, a siloxane oligomer and a solvent for both materials. The siloxane oligomer can be a hydrolytic condensation product of formula (I) which can contain non-hydrolyzable group ([0010]). The composition can be used for preparing porous films having low permittivity ([0012]). The porous films can be used for preparing electronic parts ([0102]). The siloxane oligomer can be crosslinked at a temperature of 80 to 250°C ([0088]). Narita further teaches that the fluorine resin can be thermally decomposed starting at about 400°C under nitrogen atmosphere ([0109]-[0110]). Furthermore, note that the weight loss recited in Claim 1 and Claim 12 is determined under an air stream. It is well known that a polymer decomposes far more quickly under an oxygen-containing atmosphere such as an air stream than under an inert atmosphere such as a nitrogen atmosphere. Therefore, unless Applicants can show otherwise, Examiner has a reasonable basis to believe that Yokotsuka's fluorine resins inherently have the weight loss property at 400°C determined under an air stream required in the present invention. Narita further teaches the use of metal wires in semiconductor parts ([0093] and [0102]). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of invention to use copper wires in the electronic devices because metal wires include copper wires that are widely used in semiconductor parts.

5. Claims 1-4, 6-11 and 13-65 are rejected under 35 U.S.C. 102(b) as being anticipated by Narita as evidenced by Numata (US 6 150 446).

Narita discloses a composition comprising a thermally decomposable polymer, a siloxane oligomer and a solvent for both materials, supra, which is incorporated herein by reference. Narita further teaches the use of acryl resins which are fluorine-free ([0039]). Furthermore, Numata teaches that the acryl resin is a methacrylate polymer or an acrylate polymer (col. 4, line 34). Since the Narita's acryl resin reads on the methacrylate polymer or acrylate polymer set forth in the present invention, it inherently possesses the weight loss characteristics set forth in the present invention. See MPEP 2112.01. Normally, only one reference should be used in making a rejection under 35 U.S.C. 102. However, a 35 U.S.C. 102 rejection over multiple references has been held to be proper when extra references are cited to A) Prove the primary reference contains an "enabled disclosure"; B) Explain the meaning of a term used in the primary reference; or C) Show that a characteristic not disclosed in the reference is inherent. See MPEP 2131.01. In this instance, Numata is cited here only for the purpose of showing that an acryl resin is a methacrylate polymer or an acrylate polymer.

6. Claims 15, 18-23, 25, 27, 29, 31, 34, 37, 40 and 43-65 are rejected under 35 U.S.C. 102(b) as anticipated by Imai (JP 05-294609) as evidenced by Hedrick (US 5 700 844).

Imai discloses a composition comprising an amine salt of an aromatic polyamide acid, a partially condensate of silicone alkoxide, and an alcohol as solvent. The composition is used for casting into a film which is heated below the decomposition of the film to form a polyimide-

silica composite film. Later, the composite film is further heated at a temperature higher than the decomposition temperature of the polyimide to form a porous silica film ([0007]). The silicone alkoxide can include silicone tetraalkoxide or those silicone alkoxides containing non-hydrolyzable organic group such as TEOS, methyltriethoxysilane, etc. ([0031]). The porosity of the silica film is generally below 1 μm ([0007]). Hedrick teaches that a porous silica film has a low permittivity (col. 2, lines 37-48). Therefore, Imai's porous silica film is a low permittivity film. Normally, only one reference should be used in making a rejection under 35 U.S.C. 102. However, a 35 U.S.C. 102 rejection over multiple references has been held to be proper when extra references are cited to A) Prove the primary reference contains an "enabled disclosure"; B) Explain the meaning of a term used in the primary reference; or C) Show that a characteristic not disclosed in the reference is inherent. See MPEP 2131.01. In this instance, Hedrick is cited here only for the purpose of showing that a porous silica film is a low-permittivity film. It is further noted that after the polyimide derived from the amine salt of an aromatic polyamide acid is removed, the resulting film contains only a material derived from the partially condensate of silicone alkoxide. As such, there is no difference between the resulting low-permittivity film and Applicants' low-permittivity film. The weight loss characteristics of the thermally decomposable polymer are irreverent.

7. Claims 1-4, 6-11 and 13-65 are rejected under 35 U.S.C. 103(a) as obvious over Hedrick (US 5 700 844).

Hedrick discloses a film prepared by a composition obtained by mixing a thermally decomposable polymer and a siloxane oligomer, curing the siloxane oligomer, and removing the

thermally decomposable polymer. The thermally decomposable polymer can be polymethyl methacrylate (col. 1, line 56 to col. 2, line 36 and Example 2). Since Hedrick's polymethyl methacrylate reads on Applicants' methacrylate polymer, they should possess the same weight loss property. Especially, Hedrick's polymethyl methacrylate can be decomposed at 300°C (Example 2). The film has low permittivity and can be used in electronic devices (col. 2, lines 37-48). Hedrick is silent on the use of an organic solvent. However, it would have been obvious to one of ordinary skill in the art at the time of invention to add an organic solvent in order to adjust the viscosity of the composition to facilitate the film formation. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of invention to use copper wires in the electronic devices because they are widely used in microelectronic applications.

Claim Rejections - 35 USC § 102

8. Rejection of Claims 1-3 and 8-10 under 35 USC 102(b) as being anticipated by Yokotsuka (US 5 905 117) is maintained because the rejection is adequately set forth in paragraph 3 of Paper No. 6.

Responsive to arguments regarding 35 USC § 102 and/or 103 rejection

9. Applicant's arguments filed on November 21, 2003 have been fully considered but they are not persuasive. The focus argument related to the core patentability is discussed below.

With respect to Yokotsuka, the Applicants' principal argument against the rejection is that fluorine resins generally have a heat resistance at about 400°C.

Applicants' argument is not persuasive because, to the contrary, fluorine resins can be thermally decomposed starting at about 400°C under nitrogen atmosphere as evidenced by the prior art, Narita (JP 11-217458) ([0109]-[0110]), which was cited in the previous Office action in a separate rejection. Furthermore, note that the weight loss recited in Claim 1 and Claim 12 is determined under an air stream. It is well known that a polymer decomposes far more quickly under an oxygen-containing atmosphere such as an air stream than under an inert atmosphere such as a nitrogen atmosphere. Therefore, unless Applicants can show otherwise, Examiner has a reasonable basis to believe that Yokotsuka's fluorine resins inherently have the weight loss property at 400°C determined under an air stream required in the present invention.

With respect to Ioka, the Applicants' principal argument against the rejection is that Ioka does not teach or fairly suggest the use of a decomposable polymer having the weight loss property set forth in the present invention.

Applicants' argument is not persuasive because the weight loss property of the thermally decomposable polymer is irreverent as mentioned in paragraph 3.

With respect to Narita, the Applicants' principal argument against the rejection is a) that fluorine resins are generally have a heat resistance at about 400°C; and b) acryl resins do not necessarily have the weight loss property set forth in the present invention due to the variation of (meth)acrylic monomers used for preparing the acryl resins.

Applicants' argument is not persuasive because of the following reasons: For a), the reason has already mentioned in paragraph 4 above. For b), it is well known that the thermal stability of a polymer primarily depends on that of the polymer backbone. Since all acryl resins

have similar basic backbone structures, i.e., -CH_2-C(R)C(O)- (R being H or CH_3), it inherently has the same thermal stability property.

With respect to Imai, the Applicants' principal argument against the rejection is that Imai does not teach or fairly suggest the use of a decomposable polymer having the weight loss property set forth in the present invention.

Applicants' argument is not persuasive because the weight loss property of the thermally decomposable polymer is irreverent as mentioned in paragraph 6.

With respect to Hedrick, the Applicants' principal argument against the rejection is that Hedrick does not disclose a low permittivity film having a specific permittivity of 2.5 or less can be obtained at a temperature of about 400°C.

Applicants' argument is not persuasive because Hedrick's thermally decomposable polymer and Applicants' thermally decomposable should have the same weight loss property as mentioned in paragraph 7.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kuo-Liang Peng whose telephone number is (571) 272-1091. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan, can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

klp
February 6, 2004

Kuo-Liang Peng
Primary Examiner
Art Unit 1712